

V. *On a Collection of Fishes from the Lake Ngami Basin, Bechuanaland.*
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[Received December 17, 1910; Read February 21, 1911.]

[PLATES XXXVIII.—XLIII. and Text-figures 85—87.]

IN his little book 'Mémoire sur les Poissons de l'Afrique Australe' (Paris, 1861), Count Francis de Castelnau gave the descriptions of a number of new fishes from Lake Ngami, then a lake of some importance discovered by Livingstone and Oswell. He had sent there one of his "préparateurs," Frédéric Daviaud, who brought back to Cape Town, where Castelnau was Consul, a number of dried specimens, probably accompanied by notes on the coloration, from which the descriptions were drawn up. The types of these are all lost, and as the definitions are inadequate, it has been impossible hitherto to allocate a position in the system to most of the species described by Castelnau.

Over forty years have elapsed since the publication of the 'Mémoire' quoted, and in the meanwhile no one seems to have collected fishes in the lake, which is rapidly drying up. I was therefore happy to hear, two years ago, through my colleague Mr. Ogilvie-Grant, that Mr. R. B. Woosnam was preparing an expedition to Bechuanaland, and that it might be possible to get at the lake for the purpose of obtaining a series of its fishes. An application having been made by Dr. P. L. Sclater to the Royal Society's Government Grant Committee, Mr. Woosnam was provided with the necessary means to extend his collecting-trip in that direction. Although unforeseen circumstances have prevented his reaching the lake itself, he has nevertheless been able to form a considerable collection of fishes from the Okovango river that flows into it, a collection by means of which I have been able to identify, with some approach to certainty, most of the species described by Castelnau, and thus remove a stumbling-block in African systematic ichthyology.

As Castelnau's little book is not easily procurable, I have reproduced most of the original descriptions, in order to enable others to judge of the degree of probability of my identifications, which, needless to say, in view of the unsatisfactory nature of Castelnau's work, are in some cases little more than guesses. On the other hand, a few of the species in Mr. Woosnam's collection could not be referred to any previously named, and are here described as new.

The Ngami Fish-fauna shows no feature differentiating it from that of the Zambesi, and not a few species are common to both. Although no striking discoveries have

resulted from the Expedition, Mr. Woosnam is to be congratulated on having supplied a desideratum of long standing in African Ichthyology, which has made such rapid progress during the last few years. I beg to express to him my grateful thanks for all he has done.

The specimens in the collection number 87, referable to 25 species *. They are now preserved in the British Museum.

Mr. Woosnam's report is here appended, and I may add that the notes and coloured sketches he has made on the fishes in the fresh condition have been useful in drawing up descriptions of the new or imperfectly known species.

"With regard to the present small collection from Ngamiland, although the fish are labelled 'Lake Ngami' for the convenience of reference to maps, they come in reality from the Okovango river and vast extent of marshes (of which Lake Ngami is a part) into which the river opens out before it continues its way as a single great river known as the Botletle or Zouga.

"The physical geography of Ngamiland and the Kalahari Desert may shortly be said to consist of a great shallow basin or valley surrounded by higher land. There is only one outlet to the sea towards the Orange river. The lowest part of the whole central and North Kalahari basin is the Great Makarikari Salt Pan, and I am inclined to think that there is a low, broad ridge running across the Kalahari somewhere about 23° South, and forming a low watershed between the Okovango and Nolopo Nosop river-systems; it was part of this ridge which we noticed north of Lehutitu.

"Travelling from Lehutitu to Okwa one passes for three or four days by ox-wagon over a strip of country which rises some 400 feet above that south of Lehutitu, and a thousand feet above Lake Ngami; this elevation would not be detected unless altitudes were taken daily, as the rise is very gradual and undulating, but the condition of the grass on this higher country was most noticeable. Here there had evidently been more rain, and that more recently than below, for there were quantities of young green grass twelve inches high in June, while the surrounding country was scorched and yellow, showing that more moisture and local rains had been attracted by this rising ground. Also, as soon as the descent from this elevation to the Lake was begun there was a marked change in the vegetation, and many semi-tropical trees, plentiful in the lake district, began to appear, marking, I believe, the Ngamiland side of this low watershed. Again, on the east side of the desert there is a similar phenomenon, but more sharply accentuated, the fall from Palapye level to the nearest point of the Botletle river being rather more than 2000 feet. This was noticed by Livingstone in 1849 (see Livingstone's 'Missionary Travels in South Africa,' chapter 3, p. 66).

* Three of the new species, belonging to the family Siluridae, have been described and figured in the recently published volume of the 'British Museum Catalogue of African Fresh-water Fishes' (1911), and the figures are reproduced here by permission of the Trustees

“ Now, as I have said, the lowest point of the whole Kalahari basin north of the Orange river is the Great Makarikari Salt Pan, and unless there was some rising ground between it and the Molopo and Nosop rivers, those rivers would probably have drained into it instead of into the Orange river as they do*.

“ At the present day the importance and capacity of Lake Ngami is infinitesimal when compared with the huge extent of the Okovango marshes and periodically flooded area to the north and north-east, and it is important to realize that the origin and only source of all the streams and marshes in Ngamiland is the great Okovango river (the rainfall in Ngamiland being of comparatively little importance in this respect), which rises in the Mosamba Mountains in Portuguese West Africa, and drains an enormous area with a very heavy rainfall from September to February. The result of this is a huge periodical flood which flows down the Okovango into the marshes of Ngamiland, of which Lake Ngami is really a part. These gradually rise and overspread hundreds of square miles of the surrounding country, which is extraordinarily flat, the inundation reaching its highest point not during the rainy season, but towards the end of the dry season, about August or September. None of this water finds its way out to the sea, but after filling the marshes north of the lake, and formerly the lake itself, flows on down the Botletle until lost by evaporation and percolation. No doubt on many occasions in the past some of this flood has reached the Great Makarikari Salt Pan, which is the lowest point of the whole Okovango river-system; but apparently no flood has been large enough to reach the Makarikari for many years, although an old dry river-bed can be traced a long way to the east of the present end of the Botletle.

“ There is no doubt that it is only quite recently that the water-supply of Lake Ngami has failed, and the lake partially dried up, for although the processes which brought about this result must have been in progress long before Livingstone's visit in 1849, his description of the lake and his picture clearly show it to have been then an imposing sheet of water, and to a great extent open. To-day Lake Ngami is just a great reed-bed, which dries up almost entirely by the beginning of the periodical flood. Whether there are any large pools and open sheets of water in the interior of this reed-bed which do not dry up I cannot, unfortunately, say, as no white man has ever been far into the lake †, and native evidence is not unanimous on the subject; but I am certainly inclined to agree with those who say that by about March the Lake is absolutely dry on the surface, except for a few shallow pools at the south-east corner,

* “ The watershed between the Zambesi and the Okovango river-systems is a low and very ill-defined one, and it is a doubtful question whether during the times of highest flood the Okovango marshes are not connected with the Chobe marshes.”

† “ It was very unfortunate that this point could not be cleared up, but owing to the sudden serious illness of my companion, a hasty retreat had to be made to the railway-line before the exploration of the centre of the Lake had been carried out.”

where it is connected with the Botletle. The explanation of this change in the water-supply of the lake is to be found in the fact that previously one of the many large channels of the Okovango, called the Téoughé, ran into the lake at the north-west corner, but by a natural process of reed-growth and silting-up this channel has gradually become choked, till now no water at all finds its way into the lake from the north-west, and its only source of supply is at the south-east corner, where it is connected with the Botletle by a kind of backwater or arm, and through this it receives a certain amount of water when the floods have risen sufficiently high in the Botletle*. Into this backwater from the Botletle another channel from the Tamalakan (merely another name for the upper part of the Botletle) also runs, which brings a good deal of water towards the end of the flood season, but the lake never fills now to anything like its former level.

"As far as the value of the fish collection goes, I feel quite confident that there are not and never have been any fish in Lake Ngami which are not also in the Okovango and marshes, and although it would have been of interest geographically to penetrate to the centre of the lake, it would not have produced many new fish. But that there are fish in the upper waters of the Okovango which are not found in the marshes is highly probable."

MORMYRIDÆ.

1. MARCUSENIUS CASTELNAULI, sp. n. (Plate XXXVIII. fig. 1.)

Depth of body 3 times in total length, length of head $3\frac{2}{3}$ times. Head as long as deep, twice as long as broad; snout rounded, $\frac{1}{5}$ length of head, projecting very slightly beyond mouth; mouth small, well below level of lower border of eye; teeth small, notched, 7 in upper jaw, 8 in lower; eye rather indistinctly defined, nearly as long as snout, its diameter not $\frac{1}{2}$ interocular width; posterior nostril a little lower down than upper, close to eye. Dorsal fin 17, originating above fourth ray of anal, its length half its distance from head, upper border slightly convex in front, longest ray $\frac{3}{5}$ length of head. Anal 23, similar to dorsal but longer, equally distant from base of ventrals and from base of caudal. Pectoral pointed, a little shorter than head, twice as long as ventral, extending to middle of latter. Caudal fin with rather short, rounded lobes. Caudal peduncle $2\frac{1}{2}$ times as long as deep, a little shorter than head. 48-50 scales in lateral line, $\frac{10-11}{14-15}$ in transverse series on body, $\frac{8}{7}$ in transverse series between dorsal and anal, 12 round caudal peduncle. Pale brownish, darker on the back, spotted and marbled with dark brown; fins brown.

Total length 70 mm.

* "Livingstone says that 'this channel has never been observed to flow either way, and is as stagnant as the lake itself.' This is certainly not so at the present day, for at the time of our visit it was running into the lake in a strong deep stream."

This small Mormyr, of which two specimens are in the collection, is most nearly related to *M. thuyssii* Sdr., from the Senegal, which differs principally in the higher number of dorsal and anal fin-rays.

2. GNATHONEMUS MACROLEPIDOTUS Peters.

Numerous specimens, with 21 to 26 rays in the dorsal fin and 27 to 30 in the anal.

A third Mormyr, evidently of the genus *Mormyrus*, has been reported by Castelnau from Lake Ngami, and diagnosed as follows (p. 61):—

MORMYRUS LACERDA.

“Longueur totale, 0 m. 36.—Hauteur du corps, 0 m. 09.—Épaisseur, 0 m. 45.

“Forme ordinaire du genre; les yeux placés aux deux tiers de la hauteur de la tête; dents de la mâchoire supérieure au nombre de quatre, réunies en devant en un petit faisceau; elles sont assez longues, avancées et bifides à l'extrémité. Celles de la mâchoire inférieure forment une rangée autour de la bouche; elles sont fortes, carrées, en forme d'incisives et échancrées au milieu.

“D'un gris sale, avec le dessus de la tête noire, et le dessous de la gorge d'un jaune doré. L'anale est noire.

“Dorsale, 72.—Anale, 19.—Ventrals, 6.—Pectorales, 14.—Caudale manque.”

CHARACINIDÆ.

3. SARCODACES ODOË Bl.

Hydrocyonoides cuvieri Castelnau, op. cit. p. 66.

A single specimen.

4. ALESTES LATERALIS Blgr.

Numerous specimens.

A *Hydrocyon*, probably identical with the widely distributed *H. lineatus* Blkr., has been recorded by Castelnau under the name of *Hydrocinus vittatus* (p. 65).

CYPRINIDÆ.

5. BARBUS TRIMACULATUS Peters.

Four specimens.

6. BARBUS PALUDINOSUS Peters.

A single specimen.

SILURIDÆ.

7. *CLARIAS NGAMENSIS* Casteln. (Plate XXXVIII. fig. 2.)

Castelnau's description (p. 63) is as follows:—

“Longueur, 0 m. 46.—Tête allongée, formant beaucoup plus du quart de la longueur totale; bouche portant quatre barbillons de chaque côté, le supérieur atteignant à peu près la longueur de la tête; celui du coin de la bouche est incomplet dans mon individu, mais semble avoir été assez long. Le suivant, à la mâchoire inférieure, est également incomplet, et l'autre est à peu près de la longueur du premier. La tête est couverte de fortes granulations, mais laisse au milieu deux espaces nus: l'un situé en avant et de forme allongée, l'autre placé en arrière et en ovale. L'œil est placé au tiers de la tête; la mâchoire supérieure avance considérablement sur l'inférieure. Les dents en velours forment une bande transverse; au vomer, l'on en voit une autre plaque grande, large, en forme de zone transversale, composée de petits tubercules très serrés, arrondis et disposés en pavé; à la mâchoire inférieure, elles sont semblables. Ligne latérale assez fortement marquée dans la moitié postérieure du corps; l'épine de la pectorale est grande, forte, large et à peine denticulée à son bord externe. La partie antérieure du corps est d'un noir grisâtre, le reste d'un rouge tirant sur le jaune; la caudale d'un noir foncé; l'anale d'un gris noir; la dorsale et les ventrales très noires. Le dessous du corps d'un jaune clair; nageoires avec chacune quatre bandes; sec, il paraît entièrement d'un brun obscur, avec le ventre et le dessous de la tête jaunes.

“On dit que ce poisson atteint de grandes dimensions.

“Dorsale, environ 66.—Caudale, 17.—Anale, environ 40.—Ventrales, 6.—Pectorales, 1/10.”

This description might apply to the widely distributed *Clarias lazera*, and I had provisionally referred it to the synonymy of that species ('Fishes of the Nile,' 1907, p. 288). But Mr. Woosnam's collection contains an example of a *Clarias* which differs from all the species known to me, and at the same time agrees, except for the shorter nasal barbel, for the smooth head (ascribable to youth), and for the unimportant difference in the coloration, with Castlenau's description. I therefore feel justified in bestowing on this specimen the name of *C. ngamensis*, and append a description of it.

Depth of body $6\frac{1}{3}$ times in total length, length of head 3 times. Head $1\frac{3}{4}$ times as long as broad, smooth above (young); occipital process angular; frontal fontanelle $\frac{1}{3}$ length of head; occipital fontanelle small, in advance of occipital process; eye 3 times in length of snout, 5 times in interorbital width, which equals width of mouth and $\frac{2}{3}$ length of head; band of præmaxillary teeth 4 times as long as broad; vomerine teeth granular, forming a crescentic band which, in the middle, is nearly twice as broad as the præmaxillary band; anterior mandibular teeth pointed, posterior granular. Nasal barbel $\frac{1}{2}$ length of head, maxillary $\frac{3}{4}$, reaching middle of pectoral spine, outer mandibular $\frac{2}{3}$, inner mandibular $\frac{1}{2}$. Gill-rakers long, about 30 on anterior arch.

Clavicles striated, distinct under the thin skin. Dorsal 60, its distance from occipital process $\frac{1}{5}$ length of head, its distance from caudal fin $\frac{1}{4}$. Anal 50, narrowly separated from caudal. Pectoral not quite $\frac{1}{2}$ length of head, its spine serrated on the outer border and $\frac{2}{3}$ the length of the fin. Ventral equally distant from end of snout and from caudal. Caudal fin $\frac{1}{2}$ length of head. Olive, marbled with darker; belly white.

The single specimen measures 245 mm.

This fish comes very close to *Clarias mellandi* Blgr., described from a single specimen from L. Bangwelu, and might be referred to it but for the difference in the shape of the patch of vomerine teeth. As this is, however, a character which varies with age, I should have felt inclined to suggest uniting *Cl. mellandi* with *Cl. ngamensis* were it not that the type of the latter is larger (460 mm.) than that of the former (245 mm.), and yet, judging from Castelnau's description, the condition of the vomerine teeth, "en forme de zone transversale," agrees with that seen in the small specimen brought home by Mr. Woosnam.

8. CLARIAS THEODORÆ M. Weber.

The specimens in Mr. Woosnam's collection are in some respects intermediate between *Cl. theodoræ*, known from Natal, Zululand, and the Upper Zambesi, and *Cl. fouloni* Blgr. from L. Bangwelu. Ventral $1\frac{1}{2}$ to $1\frac{3}{4}$ times as distant from caudal as from end of snout. Nasal barbel $\frac{3}{5}$ to $\frac{3}{4}$ length of head, maxillary $\frac{2}{3}$ to once. Clavicles striated, covered with thin skin. Pectoral spine feebly serrated on outer side. Dorsal 80-84. Anal 70-72.

9. SCHILBE MYSTUS L.

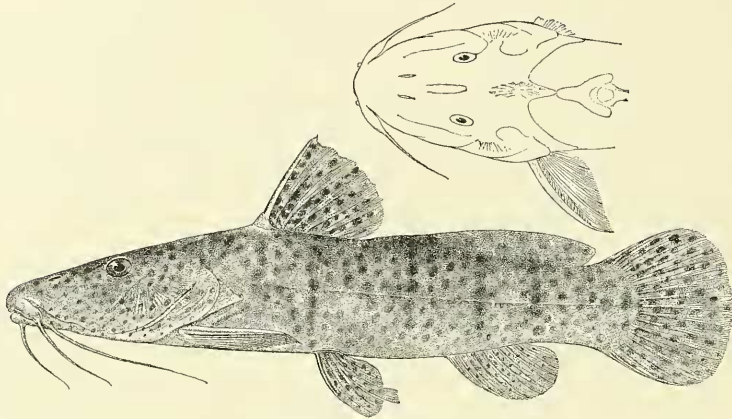
10. AUCHENOGLANIS NGAMENSIS.

Bouleng. Cat. Afr. F.W. Fishes, ii. p. 371, fig.

Depth of body $5\frac{1}{2}$ times in total length, length of head $3\frac{1}{2}$ times. Head moderately depressed, $1\frac{1}{2}$ times as long as broad, upper surface smooth; operculum with radiating striæ; occipital process small, longer than broad, in contact with the moderately large interneural plate; snout pointed, $\frac{1}{2}$ length of head; eye supero-lateral, 8 times in length of head, twice in interorbital width; mouth small, nearly terminal, with thick papillose lips; præmaxillary teeth in a small patch a little broader than long, with notched posterior border. Maxillary and inner mandibular barbels $\frac{1}{2}$ length of head; outer mandibular slightly shorter than head, reaching base of pectoral fin. Gill-rakers rather long, 8 on lower part of anterior arch. Humeral process short, triangular, feebly striated. Dorsal I 7; spine moderately strong, smooth, $\frac{1}{2}$ length of head, as long as longest soft rays. Adipose dorsal 9 times as long as deep, originating immediately behind rayed dorsal and extending nearly to root of caudal. Anal 13

(S rays branched). Pectoral not reaching ventral; spine strong, strongly serrated on inner side. Ventral not reaching anal. Caudal rounded. Olive-brown, with numerous small round black spots, some of which form vertical bars on the sides of the body; belly white.

Text-fig. 85.



Auchenoglanis ngamensis, $\frac{5}{8}$.
(From Cat. Afr. F.W. Fishes.)

Of this new species Mr. Woosnam obtained a single specimen, 220 mm. long.

A. ngamensis, is closely allied to *A. ballayi* Sauv., from Cameroon, the Gaboon, and the Congo.

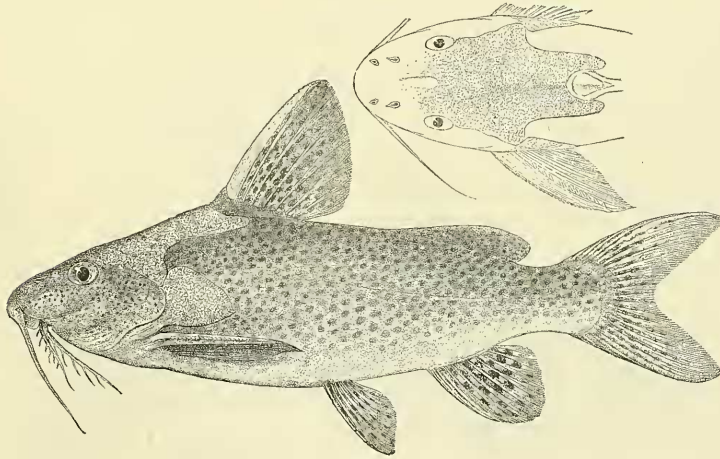
11. SYNODONTIS WOOSNAMI.

Bouleng. Cat. Afr. F.W. Fishes, ii. p. 424, fig.

Depth of body $3\frac{1}{2}$ times in total length, length of head $3\frac{2}{3}$ times. Head a little longer than broad, rugose above from between the eyes; snout as long as postocular part of head; eye supero-lateral, 6 times in length of head, twice in interorbital width; lips moderately developed; præmaxillary teeth forming a short and broad band; movable mandibular teeth $\frac{1}{3}$ diameter of eye, 20 in number. Maxillary barbel not margined, $\frac{4}{5}$ length of head, reaching a little beyond root of pectoral spine; mandibular barbels with long slender branches, outer $1\frac{1}{2}$ times as long as inner. Gill-opening not extending downwards beyond base of pectoral spine. Occipito-nuchal shield rugose like the occiput, a little longer than broad, posterior processes obtusely pointed. Humeral process slightly longer than broad, obtusely pointed, not extending so

far back as occipito-nuchal process. Dorsal I 7; spine $\frac{5}{8}$ length of head, slightly curved, smooth in front, feebly serrated behind. Adipose dorsal $3\frac{1}{2}$ times as long as deep, as long as its distance from rayed dorsal. Anal IV 8, rounded. Pectoral spine as long as dorsal, rather feebly serrated on outer border, strongly on inner. Ventral rounded, not reaching anal. Caudal deeply notched. Caudal

Text-fig. 86.

*Synodontis woosnami*. $\frac{3}{5}$.

(From Cat. Afr. F.W. Fishes.)

peduncle a little longer than deep. Dark brown above, lighter beneath; back, sides, and fins closely dotted with black.

Total length 150 mm.

A single specimen.

12. SYNODONTIS MACROSTIGMA.

Bouleng. Cat. Afr. F.W. Fish. ii. p. 432, fig.

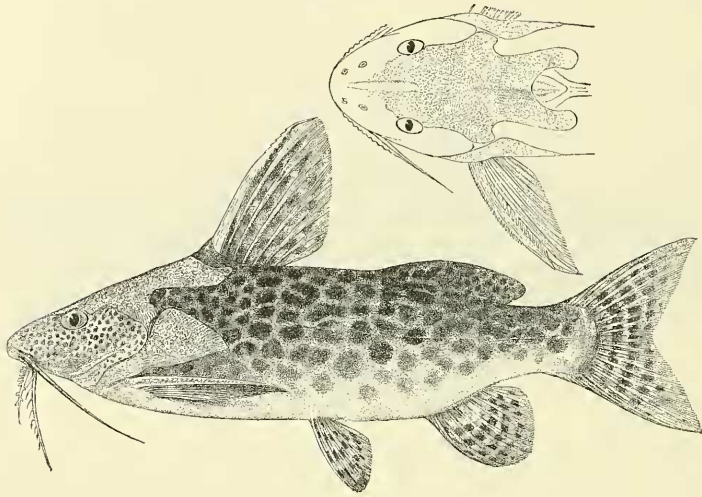
Depth of body $3\frac{1}{2}$ times in total length, length of head $3\frac{1}{3}$ to $3\frac{2}{5}$ times. Head a little longer than broad, rugose above; snout rounded and as long as postocular part of head; eye supero-lateral, 6 to $6\frac{1}{2}$ times in length of head, twice or a little over twice in interorbital width; lips moderately developed; præmaxillary teeth forming a short and broad band; movable mandibular teeth not quite $\frac{1}{2}$ diameter of eye, 20 to 26 in number. Maxillary barbel with a broad marginal membrane behind and a series of round warts in front, $\frac{4}{5}$ length of head, just reaching base of pectoral spine;

VOL. XVIII.—PART V. No. 2.—May, 1911.

3 K

mandibular barbels with short tubercular branches, outer not quite twice as long as inner. Gill-opening not extending downwards beyond root of pectoral spine. Occipito-nuchal shield rough like the occiput, merely convex, as long as broad, posterior process rounded. Humeral process a little longer than broad, triangular, granulate, without keel, extending as far back as occipito-nuchal process. Dorsal I 7; spine as long as head, slightly curved, striated, smooth in front (except towards the end), serrated behind. Adipose dorsal 4 to $4\frac{1}{2}$ times as long as deep, $1\frac{1}{3}$ times as long

Text-fig. 87.

*Synodontis macrostigma*. $\frac{3}{4}$.

(From Cat. Afr. F.W. Fishes.)

as its distance from rayed dorsal. Anal IV 8, rounded. Pectoral spine shorter than dorsal, not reaching ventral, rather strongly serrated on outer border, very strongly on inner. Caudal deeply forked. Caudal peduncle as long as deep. Brown above, lighter beneath; back and sides with large round or oval blackish spots, fins with smaller spots.

Total length 160 mm.

A single specimen.

ANABANTIDÆ.

13. ANABAS MULTISPINIS Peters.

Dorsal XVII-XVIII 9; Anal VIII-IX 9; Lateral line 32-33.

This species was known from the Lower and Upper Zambesi and Lake Bangweulu.

CICHLIDÆ.

14. HEMICHRONIS FASCIATUS Peters.

Known from the Atlantic watershed of Africa from Senegambia to Angola, and from the Chad Basin.

15. PARATILAPIA FREDERICI Casteln. (Plate XXXIX. fig. 1.)

Chromys frederici Casteln. op. cit. p. 15.

“Longueur, 0 m. 23.—Corps assez élevé; pectorales non prolongées; écailles couvertes de fines granulations, excepté sur le bord qui est lisse, au nombre de 22 sur la portion supérieure de la ligne latérale, et de 14 sur l'inférieure. Dents très peu nombreuses, surtout à la mâchoire supérieure, toutes très écartées les unes des autres, coniques et pointues, placées sur une seule ligne, si ce n'est en avant, à la mâchoire inférieure. Corps d'un blanc gris; caudale rougeâtre; anale rouge; pectorales d'un blanc sale; ventrales d'un vert peu prononcé; dorsale grise, avec les pointes rougeâtres.

“Dorsale, 15/14.—Anale, 3/8.—Caudale, 16 grands rayons.—Pectorales, 13.—Ventrales, 5.”

The following description is drawn up from three specimens, differing among themselves, as well as from Castelnau's definition, in the coloration, and for which, on account of the number of scales and fin-rays, as well as of the rather feeble dentition, I propose the name of *Paratilapia frederici*.

Depth of body $2\frac{1}{2}$ times in total length, length of head 3 times. Head twice, or a little over twice, as long as broad, upper profile slightly concave in front of eyes, jaws equal in front; snout rounded, as long as broad, as long as or slightly longer than postocular part of head; eye 5 to $5\frac{1}{3}$ times in length of head, $1\frac{1}{5}$ or $1\frac{1}{4}$ times in interorbital width, less than præorbital width; mouth not extending to below anterior border of eye; teeth in outer series rather small, 25 to 30 on each side of upper jaw, followed by one or two irregular series of minute teeth confined to the anterior part of the jaws; 3 or 4 series of scales on the cheek, the vertical diameter of the scaly part greater than diameter of eye. Gill-rakers short, knob-like or anvil-shaped, 11 or 12 on lower part of anterior arch. Dorsal XV 13–14; spines increasing in length to the last, which is about $\frac{2}{5}$ length of head; longest soft ray $\frac{3}{5}$ to $\frac{3}{4}$ length of head. Anal III 8–9; third spine longest, $\frac{1}{3}$ length of head. Pectoral $\frac{3}{4}$ to $\frac{4}{5}$ length of head, not reaching vertical of origin of anal. Ventral reaching vent. Caudal rounded. Caudal peduncle as long as deep. Scales rugose, not denticulated, 32–34 $\frac{3\frac{1}{2}}{10\frac{1}{2}}$; lat. l. $\frac{21-23}{14-15}$.

The three specimens in the collection differ, as I have said, in the coloration. One (native name: *Nchu*), sketched by Mr. Woosnam, is olive-green above, shading to pale

oil-green below, with a vertical brown bar at the base of each scale; the dorsal and ventral are represented as dark sage-green, with round yellowish-brown spots, the edge of the former and the corners of the latter crimson-red; the pectoral lake-red, the anal pink, edged with reddish and with round pinkish-white spots; the ventral olive-green. The second differs in having a blackish lateral stripe, extending from the opercular spot to the root of the caudal fin. The third has also a lateral stripe, but it is traversed by eight blackish vertical bars descending from the dorsal; round white spots (in spirit) are very distinct on the anal. The largest specimen measures 210 mm.

16. *PARATILAPIA SMITHII* Casteln. (Plate XXXIX. fig. 2.)

The original description of *Chromys smithii* (p. 16) is as follows:—

“Longueur totale, 0 m. 23.—Corps assez élevé. Pectorales non-prolongées; écailles au nombre de 22 sur la portion supérieure de la ligne latérale, et de 14 sur l'inférieure; ces écailles sont lisses sur le bord externe, avec le disque couvert de granulations, fermant un peu des lignes concentriques. Dents petites, sur deux rangées. D'un noir brillant en dessus; au dessous de la tête, d'un rouge foncé; ventre jaune; la dorsale verdâtre avec les pointes grises; les ventrales et anale violettes; les pectorales d'un violet clair; la caudale verdâtre avec les pointes violettes.”

This species is regarded as near *Chr. frederici*, and confounded with it by the natives under the name of *Tapic*. I have decided to refer to it three examples of an apparently distinct species, which I will describe under the above name.

Depth of body $2\frac{1}{3}$ to $2\frac{1}{2}$ times in total length, length of head 3 times. Head twice as long as broad, upper profile slightly concave in front of eyes; jaws equal in front; snout rounded, as long as broad, as long as postocular part of head; eye 4 to $4\frac{1}{2}$ times in length of head, $1\frac{1}{5}$ to $1\frac{1}{4}$ times in interorbital width, equal to præorbital width; mouth not extending to below anterior border of eye; teeth in outer series rather small, 26 to 32 on each side of upper jaw, followed by one or two series of minute teeth; 5 series of scales on the cheek, the vertical diameter of the scaly part a little greater than diameter of eye. Gill-rakers short, knob-like, 9 to 12 on lower part of anterior arch. Dorsal XIV–XV 12–13; spines increasing in length to the last, which is about $\frac{2}{5}$ length of head, longest soft ray $\frac{1}{2}$ to $\frac{2}{3}$ length of head. Anal III 8–9; third spine longest, about $\frac{1}{3}$ length of head. Pectoral $\frac{3}{4}$ to $\frac{4}{5}$ length of head, not reaching vertical of origin of anal. Ventral reaching vent or anal, or not so far. Caudal rounded-subtruncate. Caudal peduncle as long as deep or a little deeper than long. Scales feebly rugose, not or but indistinctly denticulated, 33–34 $\frac{3\frac{1}{2}}{10-11}$; lat. l. $\frac{21-33}{13-15}$.

Brown to blackish above (in spirit), yellowish or dark grey beneath; vertical fins olive-grey or dark brown, with round dark spots forming single series between the

rays; pectorals greyish olive; ventrals greyish olive or blackish. "Iris brown over mauve, with a thin silver ring round pupil."

Total length 220 mm.

This species is barely distinguishable from the preceding by the larger eye and the smaller scales on the cheek, which form 5 instead of 3 or 4 series.

17. *PARATILAPIA GIBBICEPS*, sp. n. (Plate XLIII, fig. 1.)

Depth of body $2\frac{1}{4}$ times in total length, length of head $3\frac{1}{6}$ to $3\frac{1}{5}$ times. Head nearly twice as long as broad, upper profile very convex above the eye, jaws equal in front; snout rounded, a little broader than long, shorter than postocular part of head; eye $4\frac{1}{3}$ to $4\frac{1}{2}$ times in length of head, $1\frac{1}{4}$ times in interorbital width, equal to præorbital width; mouth extending to below anterior border of eye; teeth in outer series rather small, about 30 on each side of upper jaw, followed by two series of minute teeth; 4 series of scales on the cheek, the vertical diameter of the scaly part a little greater than diameter of eye. Gill-rakers short, posterior T-shaped, 10 or 11 on lower part of anterior arch. Dorsal XV 12-13; spines increasing in length to the last, which is $\frac{1}{2}$ length of head, longest soft ray nearly as long as head. Anal III 10; third spine longest, $\frac{2}{5}$ length of head. Pectoral as long as head, reaching vertical of origin of anal. Ventral reaching beyond origin of anal. Caudal rounded. Caudal peduncle a little deeper than long. Scales feebly rugose, not denticulated, 31-33 $\frac{2\frac{3}{4}}{11}$; lat. 1. $\frac{21-23}{12-14}$.

Mr. Woosnam's coloured sketch of the fish (native name: *Nchu*) shows it to be olive above, pale green beneath; a purplish-brown bar at the base of the scales; pectoral pale olive, ventral dark olive; dorsal, anal, and caudal greyish; dorsal edged with red, the soft part with regular series of round purplish-brown spots; similar spots on the caudal; anal with round pink spots.

Total length 200 mm.

Two specimens.

18. *PARATILAPIA LONGIMANUS*, sp. n. (Plate XL.)

Depth of body $2\frac{2}{3}$ to $2\frac{3}{4}$ times in total length, length of head $2\frac{2}{3}$ to 3 times. Head 2 to $2\frac{1}{4}$ times as long as broad, upper profile straight or slightly concave; lower jaw slightly projecting beyond upper; snout obtusely pointed, as long as broad, shorter than postocular part of head; eye 4 to 5 times in length of head, equal to or slightly greater than interorbital or præorbital width; mouth extending to below anterior border of eye; teeth in outer series small, 26 to 30 on each side of upper jaw, followed by one or two series of smaller teeth; 5 or 6 series of scales on the cheek, the vertical diameter of the scaly part equal to or a little greater than diameter of eye. Gill-rakers short, posterior truncate or T-shaped, 9 to 11 on lower part of anterior arch.

Dorsal XV 13; spines increasing in length to the last, which is $\frac{2}{5}$ to $\frac{1}{2}$ length of head; longest soft ray $\frac{1}{2}$ to $\frac{3}{4}$ length of head. Anal III 9-10; third spine longest, $\frac{1}{3}$ to $\frac{1}{2}$ length of head. Pectoral as long as head, reaching vertical of origin of anal or beyond. Ventral reaching vent or anal. Caudal rounded. Caudal peduncle as long as deep. Scales rugose, not or but very indistinctly denticulated, 34-37 $\frac{4-12}{11}$; lat. l. $\frac{23-25}{14-15}$.

Males dark brown to blackish, the scales on the body pale greyish brown in the centre; dorsal, anal, pectoral, and caudal with a broad light edge (grey in spirit), anal with round white spots. Female olive-brown above, yellowish beneath, with ill-defined darker cross-bands; vertical fins brown, with round darker spots. The smallest specimen is brownish above (in spirit), with five rather irregular dark cross-bands, the first across the nape; lower surface of head and belly whitish; dorsal, anal, and caudal brown with dark spots; a few white spots on the posterior part of the soft dorsal; pectoral blackish. Iris brown, with a gold or silver ring round the pupil.

Total length 155 to 240 mm.

Native name: *Nchu*.

Two specimens.

19. PARATILAPIA THUMBERGI Casteln. (Plate XLI.)

A large *Paratilapia* of elongate form, usually with 17 dorsal spines, referable to *P. robusta* Gthr., a species known from Lake Nyassa, the Zambesi, and Mossamedes, answers well enough to the description of *Chromys thumbergi* and *Chr. ngamensis* of Castelnau (p. 13) to leave no doubt in my mind as to the propriety of adopting the name *P. thumbergi* in preference to the later *P. robusta*.

I here transcribe Castelnau's descriptions:—

CHROMYS THUMBERGI.

“Longueur totale, 0 m. 30; corps un peu allongé; pectorales non prolongées; dents assez grandes, serrées, aiguës et un peu crochues, sur une rangée sur les côtés, et plusieurs en avant; épines de l'anale faibles. Dessus d'un brun noir, avec le dessous du corps châtain; caudale de la couleur générale; dorsale grise, couverte de taches arrondies, noires; anale grise avec les pointes rouges; toute sa surface est couverte de taches arrondies, vertes; pectorales verdâtres, ainsi que les ventrales; iris gris.

“Dorsale, 17/13.—Anale, 3/9.—Ventrales, 1/5.—Pectorales, 15.—Caudale, 16.”

CHROMYS NGAMENSIS.

“Poisson ovalaire allongé, ayant 0 m. 33 de long; nageoire dorsale à 31 rayons, dont les 17 premiers épineux; la caudale, 16; l'anale, 3/9; les ventrales, 1/5; les pectorales, 13. Les 14 derniers de la dorsale allant progressivement en s'allongeant.—Couleur générale d'un vert foncé, devenant d'un gris obscur en arrière; nageoire

dorsale d'un gris sale, avec les rayons et l'extrémité de la partie membraneuse jaunes ; l'anale grise, parsemée de points rouges, et ayant l'extrémité jaune ; les ventrales d'un vert obscur ; les pectorales de même couleur, mais ayant leur extrémité jaune ; iris vert.—Il y a 26 écailles sur la portion supérieure de la ligne dorsale, et 17 dents fines et serrées, sur quatre rangées, à la partie antérieure de la mâchoire supérieure.

“Ce poisson est connu des naturels sous le nom de ‘Lekeguana.’”

The following description is taken from the specimens, 125 to 275 mm. long, obtained by Mr. Woosnam :—

Depth of body $2\frac{4}{5}$ to $3\frac{1}{4}$ times in total length, length of head $2\frac{3}{5}$ to 3 times. Head 2 to $2\frac{1}{4}$ times as long as broad, upper profile slightly convex or slightly concave ; præmaxillary process much shorter than the oral branch of the same bone, not extending to between the eyes ; lower jaw projecting ; snout obtusely pointed, as long as broad, shorter than postocular part of head ; eye 5 to 6 times in length of head, equal to or a little less than interorbital or præorbital width ; mouth extending to below anterior border of eye ; teeth moderate, in 3 or 4 series, 24 (young) to 40 on each side of upper jaw ; 7 or 8 series of scales on the cheek, the vertical diameter of the scaly part $1\frac{1}{2}$ to twice diameter of eye. Gill-rakers moderately long, rather slender, some of the posterior usually bifid or trifid, 11 or 12 on lower part of anterior arch. Dorsal XV–XVIII 13–16 ; spines increasing in length to the last, which is $\frac{1}{3}$ to $\frac{2}{5}$ length of head ; longest soft ray $\frac{1}{2}$ to $\frac{3}{4}$ length of head. Anal III 10 ; third spine longest, $\frac{1}{3}$ length of head. Pectoral $\frac{3}{5}$ to $\frac{2}{3}$ length of head, not reaching vertical of origin of anal. Ventral not reaching beyond vent. Caudal rounded or subtruncate. Caudal peduncle a little longer than deep. Scales feebly rugose, not or but feebly denticulate, 39–41 $\frac{4\frac{1}{2}-5\frac{1}{2}}{12-13}$; lat. l. $\frac{23-25}{17-18}$.

A coloured sketch of one of the specimens (native name : *Nchu*) represents the fish as dark olive above, orange under the head, yellow on the anterior part of the belly, bluish on the posterior part, each scale with a reddish-brown spot at the base ; dorsal and caudal dark olive, with round reddish-brown spots ; anal purplish grey, edged with yellow and with round red spots ; pectoral and ventral dark olive ; iris dark olive, with a yellow ring round the pupil.

Other specimens (in spirit) show the dark lateral band characteristic of the types of the species.

Total length 120 to 280 mm.

Chromys livingstonii Casteln. (p. 13) is regarded by that author as so similar to *Chr. ngamensis* as to constitute probably only a colour-variety. It may therefore be referred to the synonymy of *P. thumbergi*, with a query.

“La forme est semblable, mais le milieu du corps est d'un très beau jaune doré, sur un fond grisâtre ; l'extrémité de chaque écaille est rouge ; la dorsale, la caudale et

l'anale sont grises, parsemées de points rouges, et bordées de jaune ; les ventrales sont grises, avec la pointe rougeâtre ; le dessus de la tête est d'un vert sombre ; iris vert."

20. *PARATILAPIA ANGUSTICEPS*. (Plate XLIII.)

Bouleng. Ann. & Mag. N. H. (7) xx. 1907, p. 108.

The following description is taken exclusively from the six specimens in Mr. Woosnam's collection (native names: *Mpwërè* and *Nchu*). The types are from Mossamedes and the Upper Zambesi, and the species also occurs in Lake Bangwelu.

Depth of body $2\frac{2}{3}$ to 3 times in total length, length of head $2\frac{2}{3}$ to $2\frac{4}{5}$ times. Head very strongly compressed, $2\frac{1}{2}$ to 3 times as long as broad, upper profile slightly concave ; lower jaw projecting ; præmaxillary process very long, extending to between the eyes ; snout pointed, longer than broad, shorter than postocular part of head ; eye 5 to $6\frac{1}{2}$ times in length of head, equal to or a little less than the interorbital or præorbital width ; mouth extending to below anterior border of eye ; teeth in 3 or 4 series, small, 30 to 40 on each side of upper jaw ; 7 to 10 series of scales on the cheek, the vertical diameter of the scaly part $1\frac{1}{2}$ to $1\frac{3}{4}$ times diameter of eye. Gill-rakers rather short, those near the angle bifid or trifid, 11 or 12 on lower part of anterior arch. Dorsal XIV–XV 15–16 ; spines increasing in length to the last, which measures $\frac{1}{3}$ to $\frac{2}{5}$ length of head ; longest soft ray $\frac{2}{7}$ to $\frac{3}{5}$ length of head. Anal III 12. Pectoral $\frac{1}{2}$ to $\frac{3}{5}$ length of head, not reaching vertical of origin of anal. Ventral reaching vent. Caudal rounded. Caudal peduncle as long as deep. Scales slightly rugose, not or but very finely denticulated, 36–39 $\frac{6-7}{13}$; lat. l. $\frac{20-24}{16-18}$.

The largest specimen (native name : *Mpwërè*), of which Mr. Woosnam made a sketch, is yellowish olive above, yellow beneath, each scale with a dark brown bar at the base ; dorsal dark olive-grey, edged with yellow, with round brown or blackish spots between the rays ; caudal dark olive-grey, with round black spots ; anal pale olive, edged with yellow, with round bright spots edged with white ; pectoral light olive, ventral dark olive ; iris pale olive, with a yellow circle round the pupil. As now preserved this specimen has the head spotted with black.

Other specimens are brown above (in spirit) marbled with darker, and with a more or less distinct dark lateral stripe.

Total length 130 to 245 mm.

Had not the species to which these specimens belong been already properly described under the name of *P. angusticeps*, I should have been disposed to refer them, with a query, to *Chromys levaillantii* of Castelnau, which is defined as follows (p. 16):—

“Longueur, 0 m. 28.—Corps ovalaire, allongé ; bouche protractile ; pectorales assez courtes. Corps gris ; toute la tête et la gorge couvertes de points rouges. Dorsale grise, garnie de points noirs ; la caudale d'un vert sale, l'anale d'un vert jaunâtre, couverte de points rouge ; ventrales et pectorales grises ; iris d'un gris sale, avec un

cercle jaune. Dents très petites, groupées en avant et sur une seule rangée latéralement. Epines de l'anale faibles.

“Dorsale, 15/14.—Caudale, 17.—Anale, 3/11.—Ventrals, 1/5.—Pectorales, 15.”

21. HAPLOCHROMIS MOFFATI Casteln.

Chromys moffatii Casteln. op. cit. p. 16.

Chromys philander M. Weber, Zool. Jahrb., Syst. x. 1897, p. 148.

Haplochromis moffati Bouleng. Fish. Nile, p. 504.

This small and widely distributed fish was not described by Castelnau from Lake Ngami, but from the Kuruman river, a tributary of the Orange river.

22. TILAPIA ANDERSONII Casteln.

Chromys andersonii Casteln. Mém. Poiss. Afr. Austr. p. 14.

Chromys chapmanii Casteln. op. cit. p. 15.

? *Chromys sparmanni* Casteln. op. cit. p. 12 (non A. Smith).

Tilapia flavomarginata Bouleng. Ann. Mus. Congo, Zool. i. p. 123, pl. xlvi. (1899), and Poiss. Bass. Congo, p. 458 (1901).

I have little doubt that the fishes described as *Chr. andersonii* and *chapmanii* belong to the same species as I have named *Tilapia flavomarginata*, from the Mayombe, north of the Congo, which has since been rediscovered in Angola.

Castelnau's descriptions are here reproduced:—

CHROMYS ANDERSONII.

“Longueur, 0 m. 36.—Le corps est plus élevé que dans les espèces précédentes; la pectorale est très longue; la partie molle de la dorsale est aussi prolongée; l'anale est grande.

“Dorsale, 16/15.—Caudale, 15.—Anale, 3/12.—Ventrals, 5.—Pectorales, 14.—Dents posées sur quatre rangées, l'interne multiple. La couleur générale est un gris noir; la caudale d'un rouge foncé; l'anale, les pectorales, d'un blanc sale; la dorsale d'un beau gris, avec une bordure rouge. Iris noir. L'anale et la dorsale sont couvertes de taches arrondies et bleues. Les écailles sont granulées et légèrement rugueuses. La bouche est extensible. Les dents de la rangée externe sont terminées par deux tubercules.”

The number of soft dorsal rays, 15, is probably a misprint for 13.

CHROMYS CHAPMANII.

“Longueur totale, 0 m. 22.—Corps court et assez élevé.—Les quatre premiers rayons des pectorales très prolongés; écailles grandes, couvertes de rugosités disposées en lignes concentriques. Les écailles sont au nombre de 22 sur la portion supérieure de la ligne latérale, et de 12 sur la portion inférieure. Les écailles de la partie postérieure

du corps sont un peu sinueuses à leur bord postérieur, et quelques-unes échancrées au milieu. Les épines de l'anale sont très faibles. Ce poisson est d'un gris blanc; la caudale est noirâtre, avec le milieu jaune; l'anale est semblable, mais le jaune est moins éclatant; la dorsale est grise, variée de jaune, et les pointes sont rougeâtres. Les ventrales, les pectorales et le ventre sont d'un blanc jaunâtre. Les dents fines, sur plusieurs rangées très irrégulières; beaucoup d'entre elles sont terminées par deux ou trois tubercules. Dorsale, 16/11.—Anale, 3/10.—Caudale, 16.—Pectorales, 15.—Ventrales, 1/5."

C. sparmanni of Castlenau belongs probably to the same species, as far as can be guessed from the following definition:—

"Longueur, 0 m. 19; corps haut et assez court; pectorales un peu prolongées à leur partie antérieure, et atteignant presque la base de la dorsale; dents assez fortes, avancées, serrées, longues et terminées par deux tubercules ou pointes mousses, dont l'une est un peu plus longue que l'autre; épines de l'anale faibles; corps d'un vert obscur; caudale ayant sa première moitié d'un rouge foncé et l'autre d'un blanc verdâtre; l'anale, les pectorales rougeâtres; la dorsale d'un gris noir; ventrales d'un blanc sale. Dorsale, 16/12.—Caudale, 16.—Anale, 3/10.—Ventrales, 1/5.—Pectorales, 14."

Mr. Woosnam's specimens, nine in number, are here described.

Depth of body 2 to $2\frac{1}{2}$ times in total length, length of head 3 to $3\frac{5}{8}$ times. Head $1\frac{3}{4}$ to twice as long as broad; snout rounded, with straight or convex upper profile, as broad as or a little broader than long, as long as or shorter than postocular part of head; eye 4 to $5\frac{1}{2}$ times in length of head, $\frac{1}{2}$ interorbital width, equal to or a little less than præorbital depth; mouth moderate, $\frac{2}{3}$ to $\frac{3}{4}$ width of head; maxillary extending to between nostril and eye; teeth very small, in 5 or 6 series, 70 to 110 in outer series of upper jaw; 2 or 3 series of scales on the cheek, the width of the scaly part not greater than diameter of eye. Gill-rakers moderately long, 20 to 25 on lower part of anterior arch. Dorsal XV–XVII 12–13; spines increasing in length to the last, which measures $\frac{2}{3}$ to a little over $\frac{1}{2}$ length of head; longest soft ray $\frac{2}{3}$ to $\frac{4}{5}$ length of head. Anal III 10–11; third spine longest, $\frac{1}{3}$ to $\frac{2}{5}$ length of head. Pectoral 1 to $1\frac{1}{4}$ times as long as head, reaching vertical of origin of anal, or beyond. Ventral reaching vent, or not quite so far. Caudal truncate or slightly emarginate. Caudal peduncle deeper than long. Scales finely granulate, not denticulated, 31–33 $\frac{3\frac{1}{2}}{15-16}$; lat. l. $\frac{18-23}{13-16}$.

Mr. Woosnam has made two coloured sketches of the fish obtained by him (native name: *Nchanu*). The first fish is dark brown, the scales edged with bluish white; lower half of head and pectoral region bluish white, the former with large black spots and a dark blue opercular spot; dorsal and anal brown, with large round white spots, the former edged with red, the latter with purple; caudal purplish red, spotted with white; pectoral pale buff, ventral dark blue; iris dark brown, with a yellowish circle

round the pupil. The second is dark brown above, shading to whitish beneath; dorsal and caudal dark olive, spotted with whitish, the former edged with purplish red; pectoral, ventral, and anal yellowish brown; iris as in the first specimen.

In spirit, the edge of the dorsal is yellowish (*flavomarginata*).

Total length 190 to 300 mm.

23. TILAPIA SPARRMANI A. Smith.

The three specimens in Mr. Woosnam's collection, of which a description follows, seem to show the species *T. fouloni* Blgr. to be untenable.

Depth of body 2 to $2\frac{1}{3}$ times in total length, length of head $3\frac{1}{6}$ to $3\frac{1}{3}$ times. Head $1\frac{2}{3}$ times as long as broad; snout rounded, with slightly convex or slightly concave upper profile, a little shorter than postocular part of head; eye 4 to $4\frac{1}{2}$ times in length of head, $\frac{3}{5}$ to $\frac{2}{3}$ interorbital width, equal to or a little more than præorbital depth; mouth moderate, about $\frac{2}{3}$ width of head; maxillary extending to between nostril and eye; teeth small, in 4 to 6 series, 60 to 80 in outer series of upper jaw; 2 or 3 series of scales on the cheek, the width of the scaly part less than diameter of eye. Gill-rakers short, 9 to 11 on lower part of anterior arch. Dorsal XIV–XV 10–11; spines increasing in length to the last, which measures about $\frac{3}{5}$ length of head; longest soft ray $\frac{3}{4}$ to once length of head. Anal III 10; third spine longest, $\frac{2}{5}$ to $\frac{1}{2}$ length of head. Pectoral a little shorter than head, not reaching vertical of origin of anal. Ventral reaching origin of anal or a little beyond. Caudal rounded. Caudal peduncle deeper than long. Scales granulate, not denticulated, 27–28 $\frac{9-3\frac{1}{2}}{10}$; lat. l. $\frac{17-18}{11-12}$.

Mr. Woosnam describes the colour as dark olive-brown, the scales with greenish-yellow margins; dorsal, caudal, and ventral fins olive-brown like the body, the former with darker and lighter stripes, pectorals paler; lower part of jaw and lower lip tinged with greenish blue with a dash of pink; opercular spot blue-black; iris brown, with a red-gold ring round the pupil.

Total length 145 to 190 mm.

24. TILAPIA MELANOPEURA A. Dum.

Chromis latus Gthr.; *Tilapia rendalli* Blgr.

A widely distributed species in the Zambesi basin and in West Africa.

25. TILAPIA WOOSNAMI, sp. n. (Plate XLIII. fig. 2.)

Depth of body $2\frac{3}{4}$ times in total length, length of head 3 times. Head twice as long as broad; snout obtusely pointed, as long as postorbital part of head, as long as broad, with slightly convex upper profile; eye $4\frac{1}{4}$ times in length of head, equal to width of interorbital region or depth of præorbital; mouth moderate, $\frac{2}{3}$ width of head; maxillary extending to between nostril and eye; teeth in outer row rather

large, 36 in upper jaw, with an inner row of very minute teeth; 6 series of scales on the cheek, the width of the scaly part equal to diameter of eye. Gill-rakers very short, knob-like, 12 on lower part of anterior arch. Dorsal XV 13; spines equal in length from the seventh, which is $\frac{2}{5}$ length of head; longest soft rays $\frac{1}{2}$ length of head. Anal III 9; third spine longest, nearly as long as longest dorsal. Pectoral $\frac{3}{8}$ length of head, not reaching vertical of origin of anal. Ventral barely reaching vent. Caudal rounded. Caudal peduncle as long as deep. Scales with feebly denticulated border, $34 \frac{3\frac{1}{2}}{10}$; lat. 1. $\frac{22}{16}$. Brownish above, yellowish beneath (in spirit); dorsal with round black spots between the soft rays.

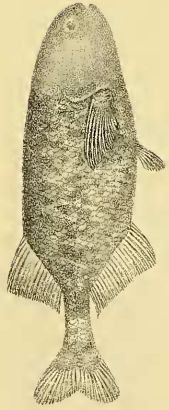
A single specimen, measuring 110 mm.

This species is allied to *T. jalla* Blgr., from the Upper Zambesi, and to *T. humilis* Sldr., from Angola.

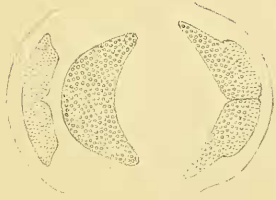
PLATE XXXVIII.

PLATE XXXVIII.

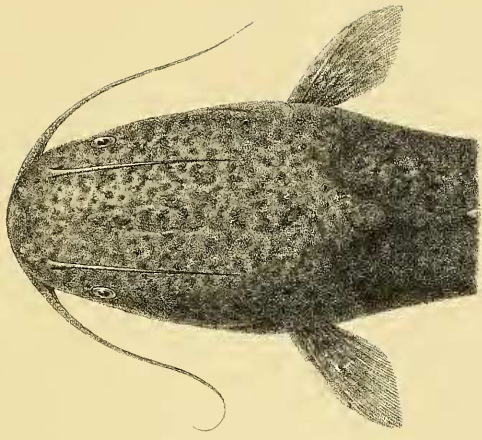
- Fig. 1. *Marcusenius castelnaui* Blgr., p. 402.
2. *Clarias ngamensis* Casteln., p. 404, with upper view of head (*a*) and enlarged view ($\frac{3}{2}$) of dentition of upper jaw and palate (*b*).



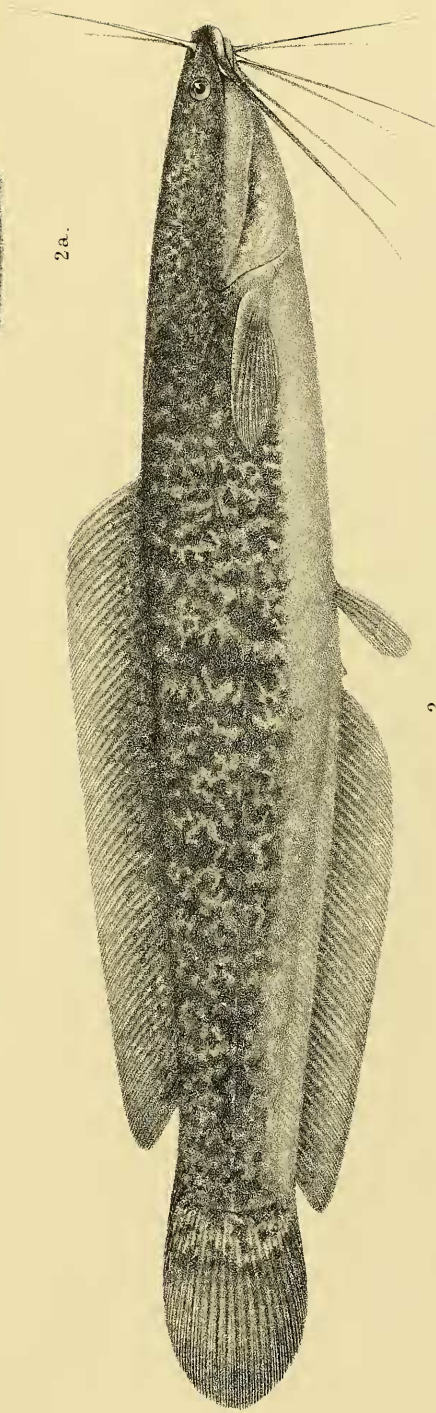
1



2b



2a.



2.

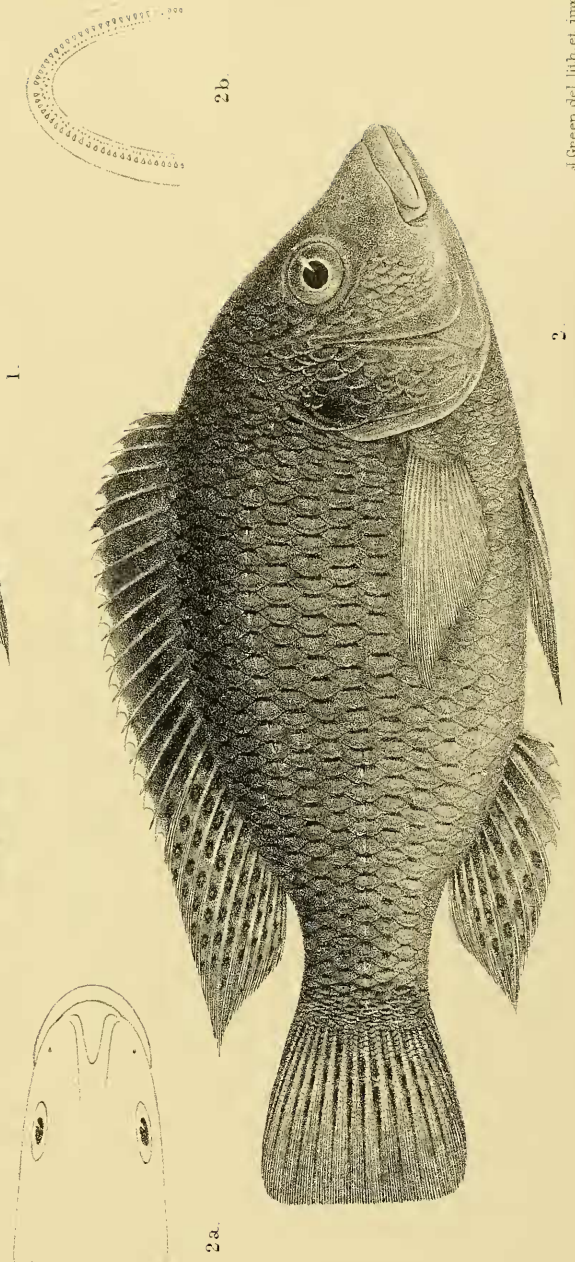
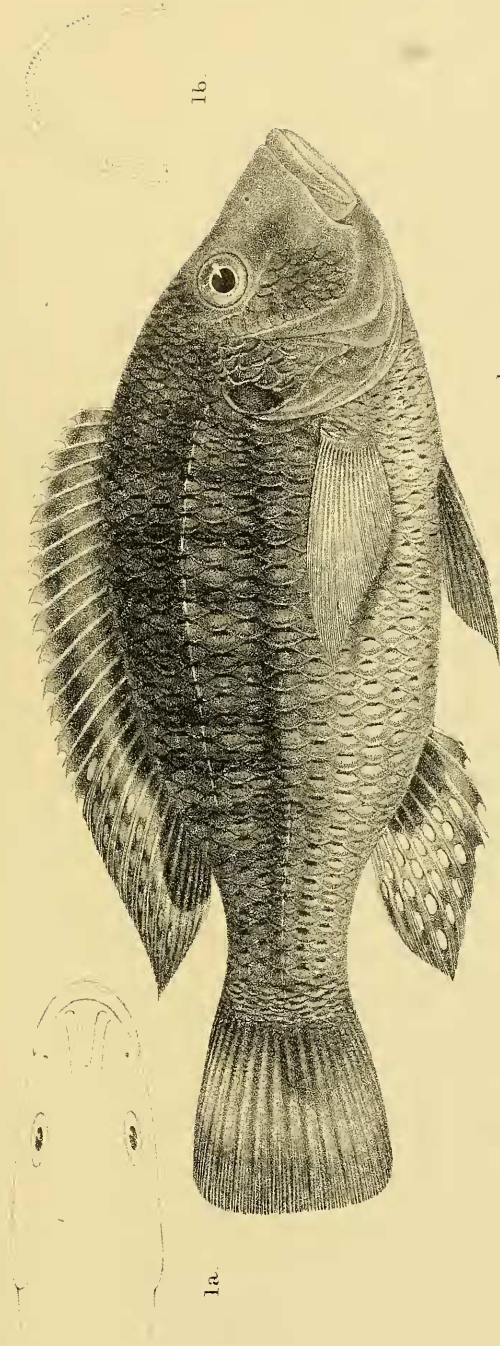
1. MARCUSENIUS CASTELNAU.

2. CLARIAS NGAMENSIS.

PLATE XXXIX.

PLATE XXXIX.

- Fig. 1. *Paratilapia frederici* Casteln., p. 409, $\frac{7}{8}$, with upper view of head (*a*) and enlarged view ($\frac{3}{2}$) of dentition of upper jaw (*b*).
2. *Paratilapia smithii* Casteln., p. 410, $\frac{7}{8}$, with upper view of head (*a*) and enlarged view ($\frac{3}{2}$) of dentition of upper jaw (*b*).



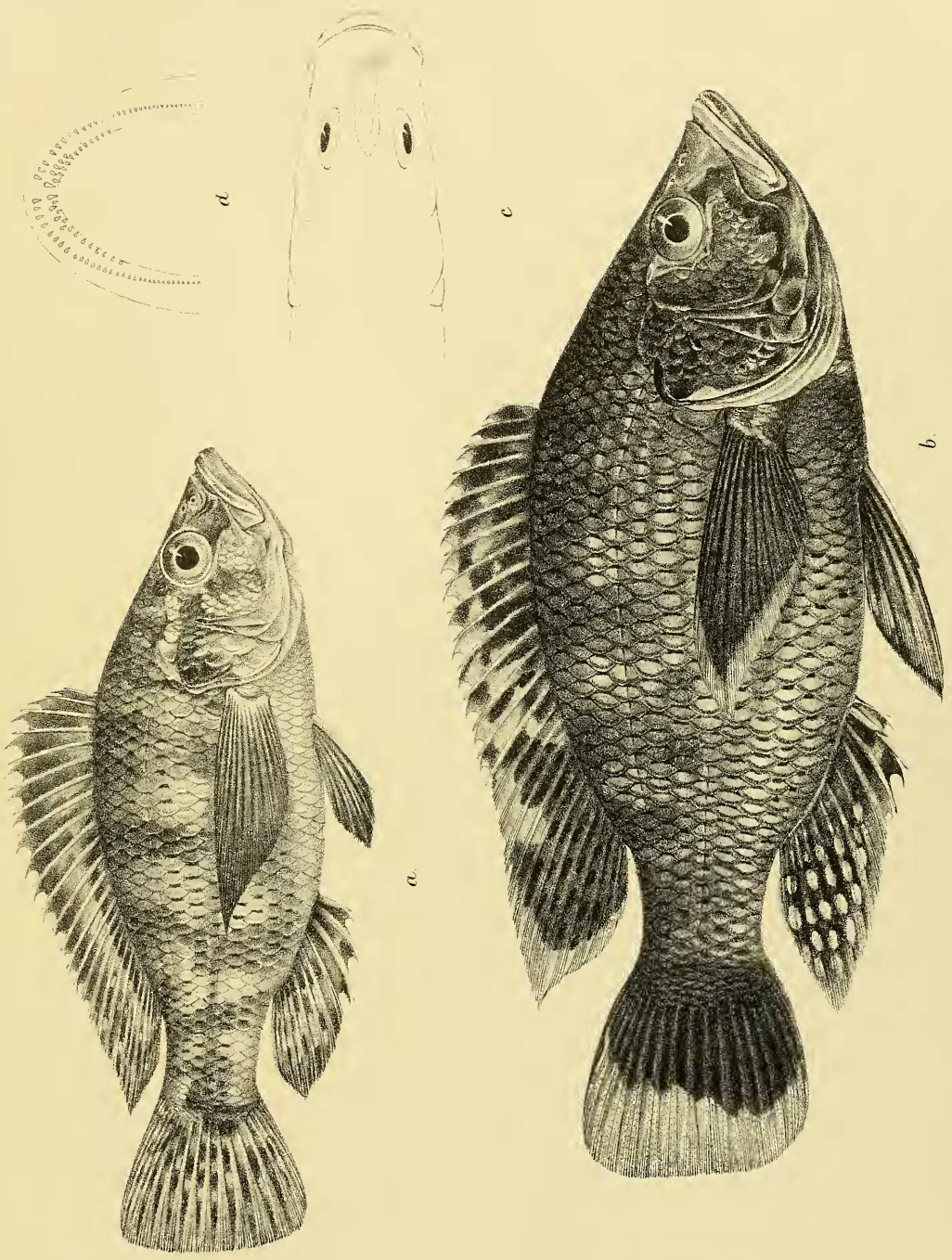
1. PARATILAPIA FREDERICI.

2. P. SMITHII.

PLATE XL.

PLATE XL.

Paratilapia longimanus Blgr., p. 411. Two specimens: upper (*a*) natural size, lower (*b*) reduced ($\frac{2}{3}$), with upper view of head (*c*) and enlarged view ($\frac{3}{2}$) of dentition of upper jaw (*d*).



PARATILAPIA LONGIMANUS.

PLATE XLI.

PLATE XLI.

Paratilapia thumbergi Casteln., p. 412. Two specimens (*a*, *b*), reduced ($\frac{3}{4}$), with upper view of head (*c*) and enlarged view ($\frac{3}{2}$) of dentition of upper jaw (*d*).

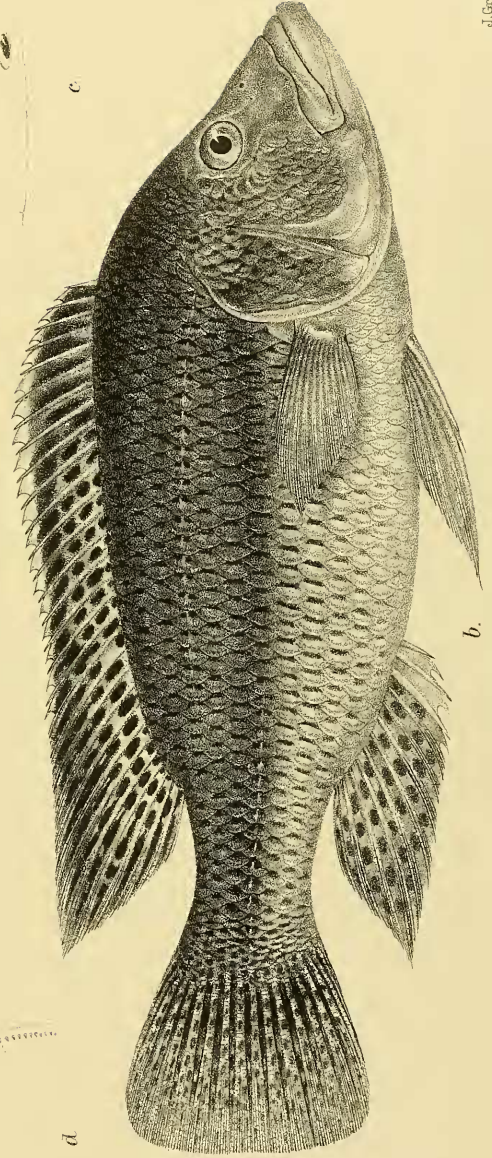
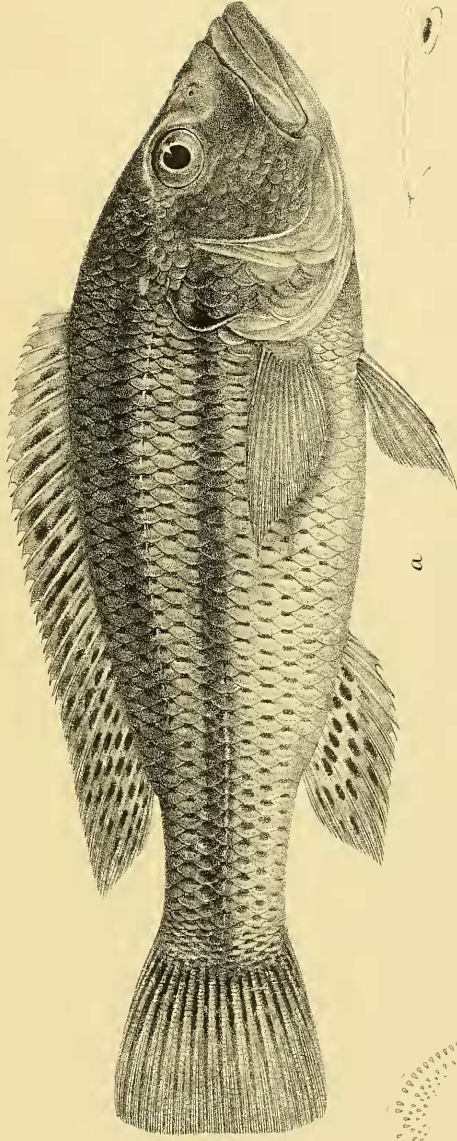
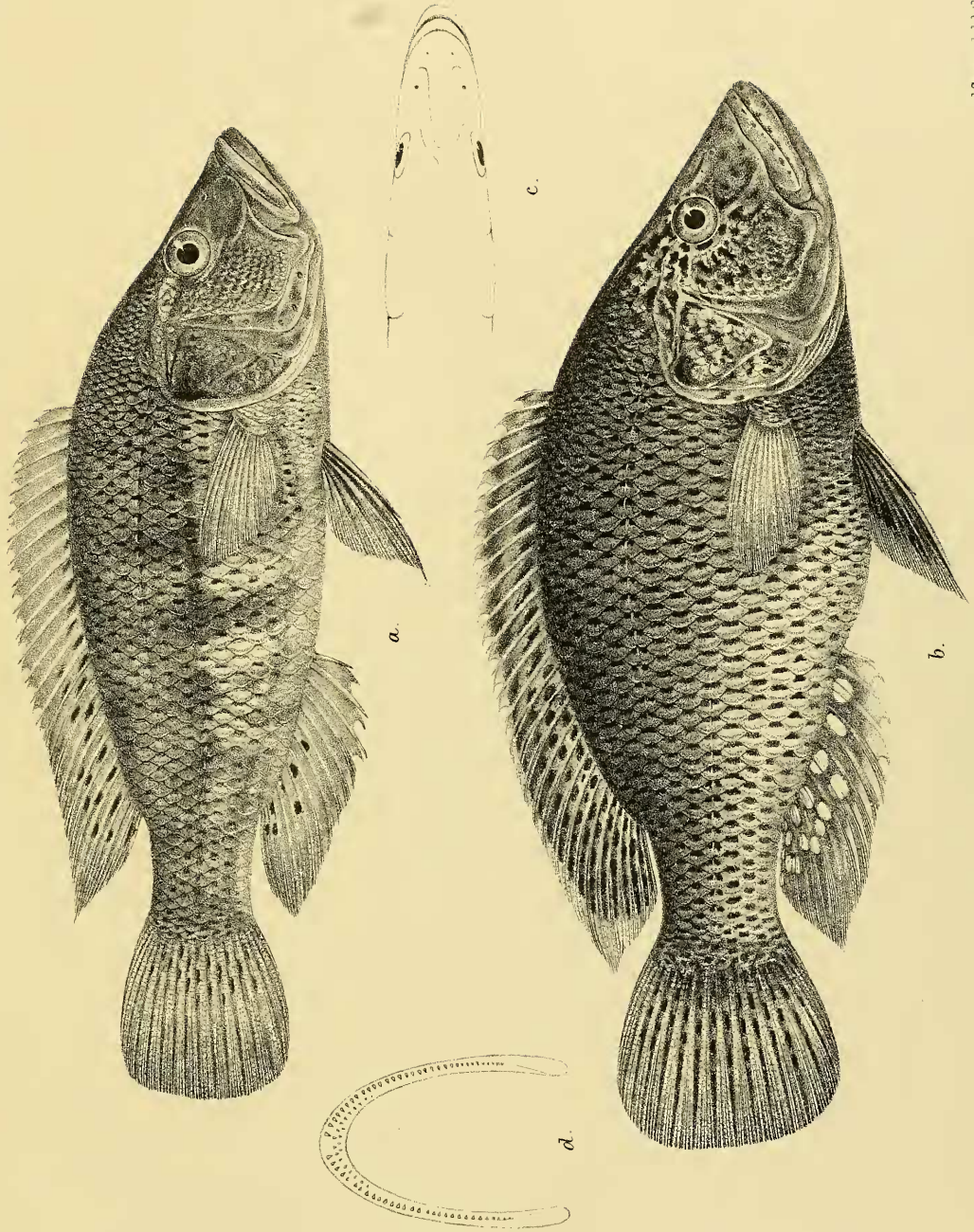


PLATE XLII.

PLATE XLII.

Paratilapia angusticeps Blgr., p. 414. Two specimens (*a*, *b*), reduced ($\frac{5}{6}$), with upper view of head (*c*) and enlarged view of dentition of upper jaw (*d*).

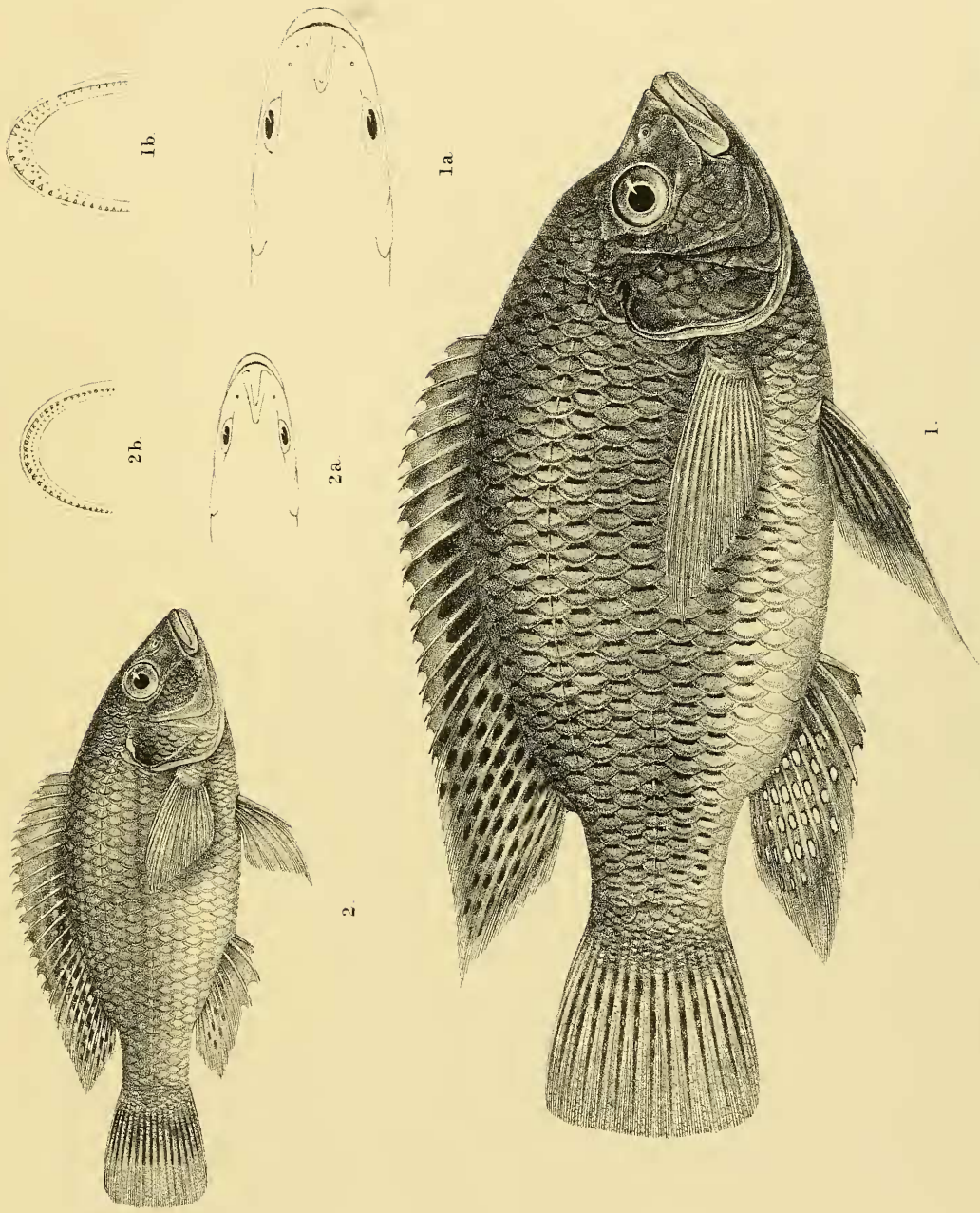


PARATILAPIA ANGSTICEPS

PLATE XLIII.

PLATE XLIII.

- Fig. 1. *Paratilapia gibbiceps* Blgr., p. 411, with upper view of head (*a*) and enlarged view ($\frac{3}{2}$) of dentition of upper jaw (*b*).
2. *Tilapia woosnami* Blgr., p. 417, with upper view of head (*a*) and enlarged view ($\frac{5}{2}$) of dentition of upper jaw (*b*).



1. *PARATILAPIA GIBBICEPS*. 2. *TILAPIA WOOSNAMI*.

LIST OF THE PAPERS CONTAINED IN VOL. XVIII.

Page	Page
BOULENGER, GEORGE ALBERT, F.R.S., V.P.Z.S.	SMITH, G. ELLIOT, M.A., M.D., F.R.S., Professor of Anatomy, School of Medicine, Cairo.
On a Collection of Fishes from the Lake Ngami Basin, Bechuanaland	On the Form of the Brain in the Extinct Lemurs of Madagascar, with some Re- marks on the Affinities of the <i>Indrisinae</i> . 163
399	
CALMAN, WILLIAM THOMAS, D.Sc., F.Z.S., British Museum (Natural History).	STANDING, HERBERT F., D.Sc. (Leeds), M.Sc. (Vict.).
On New or Rare Crustacea of the Order Cumacea from the Collection of the Copenhagen Museum.—Part I. The Families <i>Bodotriidae</i> , <i>Vauvontsoniidae</i> , and <i>Leuconidae</i>	On recently discovered Subfossil Primates from Madagascar
1	59
On New or Rare Crustacea of the Order Cumacea from the Collection of the Copenhagen Museum.—Part II. The Families <i>Nannastacidae</i> and <i>Diastylidae</i> . 341	WITH, C. J.
	An Account of the South-American <i>Cheli-</i> <i>ferinae</i> in the Collections of the British and Copenhagen Museums
	217

INDEX OF SPECIES, ETC., IN VOL. XVIII.

- Acrocrinus longimanus*, 313, 314.
Adapis, 162.
 — *magna*, 109.
Æpyornis, 60, 65, 66, 67, 71.
Alestes lateralis, 403.
Alouatta, 161.
 — *belzebul*, 148, 150.
 American, South-, *Cheliferinae*, An Account of the, in the Collections of the British and Copenhagen Museums, 217.
 Ampasambazimba, Fossiliferous Deposits at, 61.
Anabas multispinis, 408.
Aotus, 170.
Archæolemur, 72, 79, 83, 87, 89, 90, 91, 93, 95, 117, 119, 120, 128, 130, 131, 142, 147, 150, 153, 154, 155, 159, 161, 162.
 — *edwardsi*, 88, 92, 94, 95, 108, 121, 129, 130, 131, 146, 147, 148, 149, 152, 155, 192, 194, 196, 200, 206.
 — —, Description of the Skull of, 98.
 — *majori*, 99, 100, 101, 102, 129, 133, 154, 155.
 — *platyrrhinus*, 100, 129, 148, 149, 151, 198, 200.
 — —, Description of the Skull of, 103.
Atenuus, 250, 321.
 — *nidificator*, 321.
 — *subrobustus*, 260.
Auchenoglanis ballayi, 406.
 — *ngamensis*, 405, 406.
Anahis, 72, 77, 78, 82, 87, 88, 91, 117, 176.
 — *laniger*, 108.
Barbus paludinosus, 403.
 — *trimaculatus*, 403.
 Bechuanaland, On a Collection of Fishes from the Lake Ngami Basin, 399.
Bodotria, 14.
 — *arenosa*, 3, 4.
 — *gibba*, 3.
 — *parva*, 2, 3, 5, 42.
 — *pulchella*, 3, 6.
 — *pulex*, 3.
 — *scorpioides*, 3.
 — *siamensis*, 2, 3, 5, 42.
 — *similis*, 2, 3, 4, 5, 42.
 — *sublevis*, 2, 3, 42.
Bodotriidae, *Vauntomponiidae*, and *Leuconidae*, on New or Rare, in the Collection of the Copenhagen Museum, 1.
 Boulenger, G. A., On a Collection of Fishes from the Lake Ngami Basin, Bechuanaland, 399.
Brachycephalus, 111.
Brachyteles, 161.
Bradylemur, 101, 129.
Bradypus, 139.
Bradytherium madagascariensis, 138.
 British and Copenhagen Museums, An Account of the South-American *Cheliferinae* in the Collections of the, 217.
Callithrix personata, 152.
 Calman, W. T., On New or Rare Crustacea of the Order Cumacea from the Collection of the Copenhagen Museum.—Part I. The Families *Bodotriidae*, *Vauntomponiidae*, and *Leuconidae*, 1.
 — — Part II. The Families *Nannastacidae* and *Diastylidae*, 341.
Campylaspis orientalis, 341, 365, 394.
 — *platyropus*, 341, 364, 392.
 — *rubicunda*, 365.
Cebus, 161.
Centetes, 60.
Ceratocuma, 343.

- Cercopithecus*, 167.
 — *denti*, 149.
Chelanops coecus, 327.
Chelififer sp., 338.
 — *albomaculatus*, 252, 269, 270, 271, 334.
 — *amurensis*, 220.
 — *angulatus*, 229, 230.
 — *antillarum*, 252, 262, 334.
 — *argentinus*, 219, 250, 289, 290, 291, 292, 293, 296, 306, 307, 308, 309, 312, 313, 314, 320, 339.
 — *armiger*, 250, 261, 280.
 — *bicarınatus*, 220.
 — *bicolor*, 219, 250, 252, 261, 266, 267, 271, 274, 276, 277, 280, 286, 334.
 — *bifissus*, 220, 221.
 — *birmanicus*, 218, 291, 321.
 — *biseriatus*, 220.
 — *bisulcus*, 220.
 — *bocki*, 250.
 — *borneonensis*, 220.
 — *brasiliensis*, 291, 293, 296.
 — *brevifemoratus*, 253, 284, 286.
 — *cancroides*, 218, 220, 221, 225, 228, 229.
 — *canestrinii*, 229, 230, 231, 236, 238, 331.
 — *capreolus*, 307.
 — *celerrimus*, 253, 283, 284, 285, 335, 338.
 — *cervus*, 293, 316, 317, 320, 339.
 — *cimeæ*, 327.
 — *cimicoides*, 218, 250, 283, 289.
 — *coecus*, 327.
 — *communis*, 291, 292, 296, 299, 303, 338.
 — *compressus*, 250.
 — *crassimanus*, 252, 272, 273, 274, 335.
 — *depressimanus*, 293, 319, 339.
 — *depressus*, 220.
 — *disjunctus*, 220.
 — *echinatus*, 250, 262.
 — *elegans*, 261, 289, 291, 292, 293.
 — *ellingsenii*, 251, 261, 287, 288, 293, 338.
 — *elongatus*, 321, 324, 326, 340.
 — *emigrans*, 230.
 — *eccentricus*, 327.
 — *exilimanus*, 229, 230, 249.
 — *facetus*, 230.
 — *foliosus*, 251, 262, 264.
 — *germainii*, 251, 262.
Chelififer gracilis, 251, 259, 261.
 — *hermanni*, 220.
 — *hians*, 220.
 — *imperator*, 221, 225, 228, 259, 330.
 — *insignis*, 229, 230, 231, 247, 331.
 — *intermedius*, 291, 292, 296, 297, 299, 303, 338.
 — *javanus*, 220, 307.
 — *lamellatus*, 230.
 — *lamprosalis*, 220.
 — *longichelififer*, 228, 229, 230, 231, 238, 241, 245, 331.
 — *macrochelatus*, 290, 293, 308, 310, 311, 312, 316, 339.
 — *macropalus*, 221.
 — *maculatus*, 220.
 — *meinertii*, 253, 275, 335.
 — *meridianus*, 220.
 — *michaelsenii*, 253, 282, 286, 335.
 — *morensis*, 250.
 — *mortenseni*, 220, 223, 227.
 — *mucronatus*, 220.
 — *murrayi*, 229, 230.
 — *navigator*, 326.
 — *nidificator*, 257, 321, 322, 340.
 — *nitidimanus*, 252, 281, 282, 335.
 — *nitidus*, 291, 292, 303, 307, 339.
 — *nobilis*, 230, 231, 234, 330.
 — *nodulimanus*, 291, 293, 310, 314, 318, 339.
 — *nordenskjöldi*, 250.
 — *ohausi*, 250.
 — *ovatus*, 291, 292, 296.
 — *patagonicus*, 250, 251, 261, 287, 289, 293.
 — *plebejus*, 220.
 — *plumosus*, 251, 279, 335.
 — *proximus*, 230, 231, 236, 238.
 — *rex*, 221, 225, 330.
 — *robustus*, 251, 259, 261.
 — *rotundatus*, 297.
 — *rudis*, 218, 250, 253, 257, 258, 260, 334.
 — *rufus*, 230, 231, 233, 234, 235, 236, 237, 238, 239, 240, 243, 330.
 — *satanas*, 230, 245, 246, 331.
 — *scabicolus*, 220.
 — *sculpturatus*, 220.
 — *segmentidentatus*, 230, 231, 242, 244, 247, 331.
 — *similis*, 289, 292, 301, 304, 305, 310, 311, 339.

- Chelifer socotrensis*, 220.
 — *subgracilis*, 251, 257, 260, 334.
 — *subovatus*, 292, 294, 303, 338.
 — *subrobustus*, 219, 250, 251, 257, 259, 260, 261, 321, 334.
 — *subrotundatus*, 253, 277, 278, 280, 335.
 — *subruber*, 218, 228, 229, 230, 249.
 — *subrudis*, 252, 261, 264, 334.
 — *superbus*, 220.
 — *termitophilus*, 230.
 — *timidus*, 327.
 — *torulosus*, 220, 229.
 — *venezuelanus*, 250, 291, 292, 293.
Cheliferinae, An Account of the South American, in the Collections of the British and Copenhagen Museums, 217.
Chernes, 250.
 Chimpanzee, 137.
Chirogale, 109.
Chirogaleus, 72.
Chiromys, 72, 117, 143, 154, 155, 159, 167, 171, 172, 173, 174, 175, 176.
Chiropotes, 147, 148, 150.
 — *ater*, 92.
Chromys andersonii, 415.
 — *chaymanii*, 415.
 — *frederici*, 409, 410.
 — *latus*, 417.
 — *livingstonii*, 413.
 — *moftatii*, 415.
 — *ngamensis*, 412, 413.
 — *philander*, 415.
 — *smithii*, 410.
 — *sparmanni*, 415, 416.
 — *thumbergi*, 412, 413.
Chrysothrice, 161, 170.
Clarias fouloni, 405.
 — *lazera*, 404.
 — *mellandi*, 405.
 — *ngamensis*, 404, 405, 420.
 — *theodora*, 405.
Colobus, 94, 95, 146, 149.
Colurostylis, gen. nov., 343, 366, 367, 376.
 — *pseudocuma*, 342, 376, 377, 396.
 Copenhagen and British Museums, An Account of the South-American *Cheliferinae* in the Collections of the, 217.
Cryptoprocta, 60.
Cuma folinii, 3.
 Cumacea, on New or Rare, from the Collection of the Copenhagen Museum.—Part I. The Families *Bodotriidae*, *Vavuntomponiidae*, and *Leuconidae*, 1.
 — Part II. The Families *Nannastacidae* and *Diastylidae*, 341.
Cumella, 342.
 — *australis*, 344.
 — *clavicauda*, 341, 344, 346, 388.
 — *forcicula*, 341, 344, 345, 346, 347, 388.
 — *gracillima*, 344.
 — *hispidia*, 341, 344, 347, 388.
 — *levis*, 341, 344, 347, 388.
 — *leptopus*, 341, 344, 347, 388.
 — *limicola*, 344, 345.
 — *molosa*, 344.
 — *pygmaea*, 344.
 — *serrata*, 341, 344, 348, 388.
Cyclaspis, 3, 342, 361.
 — sp., 14.
 — *australis*, 7, 10, 12.
 — *biplicata*, 2, 7, 17, 19, 46.
 — *bistriata*, 18.
 — *cingulata*, 2, 7, 15, 48.
 — *costata*, 7, 16.
 — *elegans*, 2, 7, 9, 12, 18, 19, 44.
 — *exsculpta*, 6, 9, 12, 16.
 — *herdmani*, 6, 8, 13.
 — *hornelli*, 6, 8, 13.
 — *levis*, 2, 6, 8, 17, 50.
 — *longicaudata*, 6, 11, 12.
 — *longipes*, 2, 6, 7, 50.
 — *persculpta*, 6, 9, 12, 16.
 — *picta*, 6, 8, 16.
 — *pusilla*, 6.
 — *siboga*, 7.
 — *similis*, 2, 7, 12, 46.
 — *thomsoni*, 2, 7, 16, 50.
 — *triplicata*, 2, 7, 19, 46.
 — *unicornis*, 2, 7, 14, 50.
 — *uniplicata*, 2, 7, 13, 48.
Diastylidae and *Nannastacidae*, on New or Rare, in the Collection of the Copenhagen Museum, 341.
Diastylis, 366, 367.
 — *arenaria*, 382.

- Diastylis fistularis*, 342, 367, 382, 383, 398.
 — *goodsiri*, 383.
 — *insularum*, 342, 385.
 — *koreana*, 342, 382, 398.
 — *tubulicauda*, 384.
Diastyloides, 367.
Diastylopsis, 366, 367, 378.
 — *crassior*, 342, 381, 398.
 — *elongata*, 342, 379, 381, 398.
Dolichocephalus, 111.
Dryopithecus, 158.
Eocuma hilgendorfi, 20, 23.
 — *lata*, 2, 20, 22, 23, 52.
 — *longicornis*, 2, 20, 25, 52.
 — *producta*, 2, 20, 24, 52.
 — *stellifera*, 2, 20, 23, 52.
 — *taprobatica*, 20, 21, 22, 23.
Eudorella, 31.
 — *hispidia*, 33.
 — *nana*, 33.
 — *pusilla*, 33.
 — *truncatula*, 2, 33.
Eudorellopsis, 31, 34.
 — *deformis*, 33.
 — *resimus*, 2, 33, 56.
 Fishes from the Lake Ngami Basin, Bechuanaland, 399.
Galago, 72.
Garypide, 229.
Globilemur, 171, 176.
Gnathomemus macrolepidotis, 403.
 Gorilla, 137.
Gynodiastylis, gen. nov., 366, 367.
 — *bicristata*, 342, 367, 368, 374, 396.
 — *carinata*, 342, 367, 368, 371, 372, 373, 374, 375, 394.
 — *costata*, 342, 367, 368, 372, 396.
 — *levis*, 342, 367, 371, 394.
Hadropithecus, 72, 102, 117, 153, 161, 162.
Hapale, 176.
Hapalemur, 72, 119, 154.
 — *griseus*, 146.
Haplochromis moffati, 415.
Hemichromis fasciatus, 409.
Hemilamprops, 31.
Hemileucon, gen. nov., 2, 32, 37.
 — *comes*, 2, 38, 58.
Hemileucon uniplicatus, 2, 37, 39, 58.
Heteroleucon, gen. nov., 1, 32, 34.
 — *akarœnsis*, 2, 31, 34, 36, 56, 367.
Hydrocinus vittatus, 403.
Hydrocyon lineatus, 403.
Hydrocyonoides cuvieri, 403.
Hylobates, 137, 167.
Indris, 72, 75, 77, 78, 79, 80, 81, 82, 87, 88, 89, 90, 91, 92, 93, 94, 95, 102, 117, 155, 168, 171, 174, 176.
 — *brevicaudatus*, 108, 168, 169, 170, 171.
Indrisinae, Certain Affinities of the, 175.
 —, Some Remarks on the Affinities of the, 163.
Iphinoë sp., 2, 28.
 — *brevipes*, 28.
 — *serrata*, 28.
Jacchus, 161.
 Lake Ngami Basin, Bechuanaland, On a Collection of Fishes from, 399.
Lamprochernes, 250, 291.
 — *argentinus*, 307.
 — *elegans*, 293.
 — *intermedius*, 297.
 — *macrochelatus*, 310.
 — *ovatus*, 296.
 — *similis*, 305.
 — *venezuelanus*, 293.
Lamprops, 31.
Lemur, 72, 102, 117, 128, 131, 133, 162, 167, 175, 176.
 — *catta*, 165.
 — *fulvus*, 164, 165.
 — *insignis*, 119, 120, 121, 122.
 — *jullyi*, 108, 119, 130, 146, 149, 163, 164, 165, 166, 167, 168, 173, 174, 176, 214.
 — —, Description of the Skull of, 120.
 — —, Form of the Brain in, 163.
 — *macaco*, 164, 165, 168, 172.
 — *majori*, 119, 122, 123, 125, 130, 145, 161, 216.
 — *maziensis*, 121.
 — *mongoz*, 164.
 — *varius*, 108, 120, 121, 146, 164, 165, 167, 172, 176.
 Lemurs, General Conclusions concerning the Relationships of the, 161.

- Lemurs of Madagascar, On the Form of the Brain in the Extinct, 163.
- Lepidolemur*, 72, 108, 109, 149, 175.
- Leptocuma kinbergii*, 2, 30.
- Leptostylis*, 367.
- *insularum*, 366.
- *thileniensi*, 366.
- *walkeri*, 366.
- Leucon*, 31, 33, 34, 37.
- *assimilis*, 31.
- *heterostylis*, 2, 31, 32, 56.
- *longirostris*, 31, 32.
- *nasica*, 31.
- Leuconidae*, *Bodotriidae*, and *Vauntomponiidae*, On New or Rare, in the Collection of the Copenhagen Museum, 1.
- Lophochernes*, 228.
- Loris*, 72, 117, 175, 176.
- Macacus cynomologus*, 102.
- Madagascar, On recently discovered Subfossil Primates from, 59.
- , On the Form of the Brain in the Extinct Lemurs of, 163.
- Marcusevius castelnavii*, 402, 420.
- *thuyssii*, 403.
- Megalapsis*, 65, 72, 74, 77, 99, 109, 120, 127, 128, 131, 132, 133, 134, 136, 148, 149, 151, 153, 159, 163, 172, 173, 174, 175, 176.
- *edwardsi*, 109, 110, 111, 112, 115, 116, 138.
- *grandidieri*, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 135, 137, 146, 208, 210, 212.
- *insignis*, 109.
- *madagascariensis*, 71, 109, 110, 111, 112, 113, 115, 116, 126, 139.
- Megalindris gallieni*, 138, 139.
- Mesopropithecus*, 71, 72, 73, 83, 88, 89, 90, 91, 93, 128, 130, 131, 145, 147, 148, 149, 153, 161, 162, 163, 166, 168, 171, 173, 174, 176.
- *pithecoides*, 83, 87, 92, 94, 95, 108, 120, 121, 130, 133, 146, 149, 150, 152, 163, 176, 202, 204, 206.
- —, Description of the Skull of, 87.
- —, Form of the Brain in, 168.
- Microcebus*, 175.
- Mormyrus lacerda*, 403.
- Mycetes*, 161, 170.
- *palliatus*, 152.
- Nannastacidae* and *Diastylidae*, On New or Rare, in the Collection of the Copenhagen Museum, 341.
- Nannastacus*, 342, 343, 346, 361.
- *agnatus*, 341, 351, 360, 392.
- *brachydactylus*, 352.
- *gibbosus*, 341, 351, 355, 390.
- *hirsutus*, 352.
- *lepturus*, 341, 352, 390.
- *longirostris*, 28, 352.
- *minor*, 341, 351, 357, 360, 392.
- *reptans*, 341, 351, 356, 358, 360, 390.
- *sukmii*, 351, 354, 356.
- *tardus*, 341, 351, 357, 358, 360, 392.
- *unguiculatus*, 351, 354, 357, 358, 362.
- *zimmeri*, 341, 350, 351, 352, 354, 355, 356, 390.
- Necrolemur*, 162.
- Nesopithecus*, 83, 97, 163, 166, 169, 174, 176.
- , Form of the Brain in, 171.
- Ngami Basin, Bechuanaland, On a Collection of Fishes from, 399.
- Nycticebus*, 72, 108, 117, 119, 167, 170.
- Nyctipithecus*, 90, 148, 153, 154, 161, 170.
- Pachystylis*, 367.
- *rotundata*, 385.
- Palaeopropithecus*, 71, 72, 73, 77, 78, 79, 80, 83, 87, 91, 92, 93, 94, 98, 99, 100, 101, 121, 131, 132, 133, 134, 136, 142, 145, 147, 148, 149, 150, 151, 152, 153, 155, 156, 159, 161, 163, 166, 174.
- *ingens*, 74, 83, 139.
- *maximus*, 67, 73, 74, 75, 81, 82, 84, 85, 86, 102, 108, 128, 129, 135, 137, 139, 146, 154, 163, 174, 176, 180, 182, 184, 186, 188, 190.
- —, Description of the Skull of, 74.
- —, Form of the Brain in, 172.
- Papio*, 78, 149, 151, 161.
- Paradiastylis*, 366.
- *longipes*, 342, 376.
- Paraleucon*, gen. nov., 2, 32, 36, 37, 38.
- *suteri*, 2, 36, 58.
- Paratilapia angusticeps*, 414, 428.
- *frederici*, 409, 422.
- *gibbiceps*, 411, 430.
- *levallantii*, 414.

- Paratilapia longimanus*, 411, 424.
 — *robusta*, 412.
 — *smithii*, 410, 422.
 — *thumbergi*, 412, 425.
- Pedilanthus*, 157.
- Peloriadapis*, 109, 111.
- Perodicticus*, 72, 119, 161, 167, 171, 176.
 — *potto*, 108.
- Pithecia*, 82, 94, 95, 119, 154, 161, 171.
 — *leucocephala*, 92.
 — *rufiventer*, 77, 81, 92.
- Platylobates*, 158.
- Platipitecus*, 158.
- Primates, On recently discovered Subfossil, from Madagascar, 59.
- Propithecus*, 72, 74, 75, 77, 78, 79, 80, 81, 82, 83, 87, 88, 89, 90, 91, 92, 93, 94, 102, 117, 130, 131, 149, 154, 155, 167, 170, 171, 174, 175, 176.
 — *coquereli*, 168, 169, 170.
 — *diadema*, 95, 108, 146, 168, 170.
 — *edwardsi*, 152.
- Pseudocuma longicornis*, 377.
- Pseudodiastylis*, 366, 367.
- Pseudoleucon*, 31, 34.
- Sarcodaces odoë*, 403.
- Schilbe mystus*, 405.
- Schizotrema*, gen. nov., 343, 360.
 — *bifrons*, 341, 361, 362, 392.
 — *depressum*, 341, 361, 363, 392.
 — *sordidum*, 341, 361, 363, 392.
- Semnopithecus*, 154.
- Simia*, 137.
- Smith, G. E., On the Form of the Brain in the Extinct Lemurs of Madagascar, with some Remarks on the Affinities of the *Indrisinæ*, 163.
- Standing, H. F., On recently discovered Subfossil Primates from Madagascar, 59.
- Stephanomma goesii*, 14.
- Synodontis macrostigma*, 407, 408.
 — *woosami*, 406, 407.
- Tarsius*, 72, 117, 119, 161, 162, 175, 176.
- Tilapia andersonii*, 415.
 — *flavomarginata*, 415, 417.
 — *fouloni*, 417.
 — *humilis*, 418.
 — *jallæ*, 418.
 — *melanopleura*, 417.
 — *rendalli*, 417.
 — *sparmani*, 417.
 — *woosami*, 417, 430.
- Trachychernes*, 250.
 — *albomaculatus*, 269.
 — *armatus*, 261.
 — *bicolor*, 267.
 — *crassimanus*, 272.
 — *subrotundatus*, 277.
 — *subrudis*, 264.
- Tyroglyphus*, 310.
- Vauntomponia arabica*, 2, 29, 54.
 — *cristata*, 2, 29, 30.
- Vauntomponiidae*, *Bodotriidae*, and *Leuconidae*, on New or Rare, in the Collection of the Copenhagen Museum, 1.
- With, C. J., An Account of the South-American *Cheliferinæ* in the Collections of the British and Copenhagen Museums, 217.
- Zygosiphon*, gen. nov., 1, 25, 343, 361.
 — *mortenseni*, 2, 25, 54.